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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|-----------------|-------------|----------------------|---------------------|------------------|
|-----------------|-------------|----------------------|---------------------|------------------|

10/553,196

10/13/2005

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EXAMINER

LANGEL, WAYNE A

ART UNIT

PAPER NUMBER

1736

NOTIFICATION DATE

DELIVERY MODE

07/06/2011

ELECTRONIC

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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|                              |                                      |  |  |
|------------------------------|--------------------------------------|--|--|
| <b>Office Action Summary</b> | <b>Application No.</b><br>10/553,196 | <b>Applicant(s)</b><br>HASEGAWA ET AL. |  |
|                              | <b>Examiner</b><br>JAMES A. FIORITO  | <b>Art Unit</b><br>1736                |  |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 15 January 2010.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-16 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-16 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date <u>1-15-10, 10-20-09, 6-27-06 and 10-13-05</u> . | 6) <input type="checkbox"/> Other: _____  |

## **DETAILED ACTION**

### ***Claim Rejections - 35 USC § 102***

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

### ***Claim Rejections - 35 USC § 103***

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

**Claims 1-3 and 16 are rejected under 35 U.S.C. 102(a) as being anticipated by Hirao "Preparation of Long Fibrous Titanium Oxide Nanotube".**

Hirao teaches the length of the nanotube may be 20 microns long (Results).

With respect to claim 2-3 and 16, the diameter of the tube may be 50 nm (Figure 5).

**3. Claims 1-3, 5-13, and 15-16 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Kasuga "Formation of titanium oxide nanotube," American Chemical Society (1998).**

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4. Kasuga teaches a method of producing titania nanotubes by dispersing nanometer size titanium dioxide in sodium hydroxide at temperature of 60 degrees C (Page 3161 Column 2). The resulting nanotubes have a diameter of 0.05 - 0.15 microns and an aspect ratio between 40 and 100 (Page 3160 Column 1 ).

**5. Claims 4 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kasuga "Formation of titanium oxide nanotube", American Chemical Society (1998) in view of Grimes "A sentinel sensor network for hydrogen sensing", Sensors (Published February 2003).**

6. Kasuga does not expressly teach a sensor having the titania nanotube according to claim 1 or 2 and an electrode in which the titania nanotube and the electrode and connected.

7. Grimes teaches the use of titania nanotubes as hydrogen sensors, wherein the titania nanotubes and connected to platinum electrodes (Abstract).

8. At the time of invention it would have been obvious to a person of ordinary skill in the art to form the process of Kasuga to include the titania nanotubes being uses as hydrogen sensors in view of the teaching of Grimes. The suggestion or motivation for doing so would have been to form a wireless sensor network for in-situ monitoring of atmospheric hydrogen concentration (Abstract).

### ***Response to Arguments***

9. Applicant's arguments filed 1/8/2010 have been fully considered but they are not persuasive.

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10. Applicant argues that the reactants in the reaction are not dispersed. In response, the process taught in Kasuga inherently requires some level of dispersion of the reactants in order to facilitate a reaction.

11. Applicant argues that the “ $\approx$ ” sign means “not more than.” In response, there is no evidence in support of this argument, and it appears that the same sign could mean “approximately.” The applicant has not put forth any evidence supporting the reading of the symbol.

12. Applicant argues that Kasuga 1 has not confirmed titanium oxide nanotubes of the length of 10  $\mu\text{m}$  or more. In response, Kasuga’s teaching of needle shaped titanium dioxide having a diameter of 0.05 to 0.15  $\mu\text{m}$  with an aspect ratio of 40-100 serves as confirmation of a titania nanotube having a length of 10  $\mu\text{m}$  or more.

13. The applicant disagrees with the above analysis using the aspect ratio to determine the sizes of the nanotubes disclosed in Kasuga but has not provided any factual evidence to disprove the assertion.

Applicant argues that Kasuga 1 does not teach dispersion by stirring or ultrasonication. In response, it appears that claims 12 and 13 do not require dispersion of the reactants, only that some dispersion occurs by ultrasonication. Kasuga teaches dispersion in ethanol by an ultrasonic bath (Page 3162 Column 1). However, even if the claims requires that the reactants be dispersed by stirring or ultrasonication, it would be obvious to one of ordinary skill in the art to disperse the reactants of Kasuga by stirring or ultrasonication since stirring or ultrasonication are among the finite number of

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possible means of contacting to liquid reactants known to those with ordinary skill in the art. See *KSR*.

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to JAMES A. FIORITO whose telephone number is (571)272-7426. The examiner can normally be reached on 9am - 6pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stanley Silverman can be reached on (571) 272-1358. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Wayne Langel/  
Primary Examiner, Art Unit 1793